

I is speeded up, a smooth straight, intermediate portion providing a main restriction to gas flow and a smooth, outwardly tapered, conical shaped outlet portion through which said gas flow is gradually slowed down, reducing the gas pressure loss and rendering gas flow substantially isoentropic.

I-2 5. (Amended) In an oil well having a casing and a tubing with an annulus defined therebetween, an apparatus for controlling the flow of gas from said annulus into said tubing, said apparatus comprising:

a gas lift valve mounted on said tubing and having an inlet end in communication with said annulus for admitting gas from said annulus into said gas lift valve, and an outlet end in communication with an interior of said tubing, for discharging gas into said tubing;

said gas lift valve including a housing and a nozzle mounted in said housing, said nozzle being provided with a continuously open passage through which gas is allowed to flow, said passage comprising:

a convergent inlet portion through which gas flow is gradually accelerated, and a divergent outlet portion through which said gas flow is gradually slowed down, thereby reducing the gas pressure loss and rendering the gas flow substantially isoentropic.

I-3 7. (Amended) In a gas lift system for injecting pressurized gas into a well having a production string, a gas flow control valve comprising:

a housing including at least one inlet port and at least one outlet port; an orifice comprising a nozzle portion and a diffuser portion; said nozzle portion including a nozzle first end, a nozzle second end, and a nozzle flow path between said nozzle first end and said nozzle second end; said nozzle flow path converging from said nozzle first end to said nozzle second end, such that the gas experiences a decrease in pressure;

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said diffuser portion including a diffuser first end and a diffuser second end, and a diffuser flow path therebetween,

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said diffuser flow path diverging from said diffuser first end to said diffuser second end, such that the gas experiences a rise in pressure, said diffuser first end being disposed adjacent said nozzle second end, such that a throat is defined therebetween, said diffuser flow path being aligned with said nozzle flow path to provide a continuous flow path;

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whereby pressurized gas can flow into said at least one inlet port of said gas flow control valve through said continuous flow path, and out through said at least one outlet port into a production string.

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13. (Amended) A method for achieving flow through a flow control valve in a well having a tubing concentrically spaced within a casing by an annulus, comprising the steps of:

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placing a gas lift valve within the well, at a predetermined location, said gas lift valve having an inlet end in communication with said annulus, and an outlet end in communication with an interior of said tubing;

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flowing compressed gas into the annulus;

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flowing the compressed gas from the annulus into a convergent nozzle portion of the gas lift valve;

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gradually accelerating gas flow through said nozzle portion;

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gradually slowing down said gas flow in a divergent outlet portion of the gas lift valve, thereby reducing the gas pressure loss and rendering the gas flow substantially isoentropic; and

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mixing gas ejected from the outlet portion of the gas lift valve with reservoir fluids in the tubing.